therapy [PDT], photothermal therapy, radiofrequency interstitial tumor ablation [RITA], focal laser ablation [FLA]) but only limited data have been published on the primary PPI. From the technique point of view, PPI is now feasible with focal BRT and EBRT. The majority of series include both low-dose-rate (LDR) and HDR BRT and only recently feasibility of PPI by EBRT has been reported[4,5]. According to the international&interdisciplinary panel consensus[6], the selection criteria for focal therapy include unilateral low-to-intermediate risk disease ≤ cT2a (prostate size, tumor volume, and topography depend on the ablative technology used). As for any other focal therapy, focal RT remains investigational until numerous questions are answered: initial diagnostic tools to identify DIL (imaging, biopsy), technical parameters of focal therapy, follow-up exams and scheduling, tumor control (patterns of failure) and toxicity profile including erectile dysfunction and quality of life (in particular, compared to the whole prostate therapy), response evaluation and failure definition (nadir+2 is used, but in some series biopsy is routinely performed), salvage therapy and cost-benefit. Ongoing trials like NCT013549951 and NCT00807820 will contribute to further assessment of PPI.

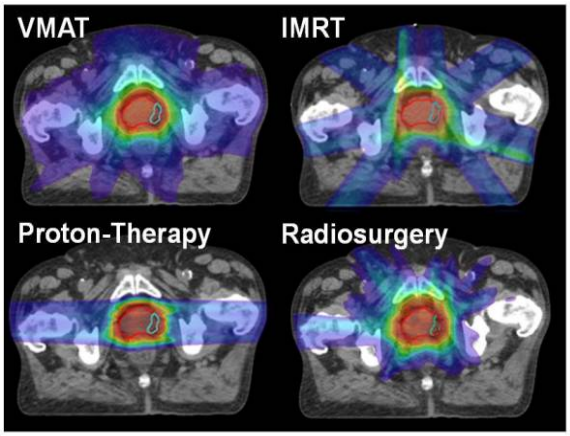

Figure – Example of extreme hypofractionation in a planning study. Four dose distributions were obtained using different planning techniques (Volumetric Modulated Arc Therapy [VMAT], Intensity Modulated RT [IMRT], Proton-Therapy and Radiosurgery), prescribing 7.25 Gy/fraction to prostate and 7.5 Gy/fraction to DIL, for 5 fractions. DIL was identified on mpMRI.

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Lymph nodes

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Significant reduction of acute toxicity after IG-IMRT compared to 3D-CRT in prostate cancer patients

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Purpose/Objective: Image-guided IMRT (IG-IMRT) is associated with significant dose reductions to organs at risk (OAR) compared to 3D-conformal radiotherapy (3D-CRT) in prostate cancer patients. However, clinical data identifying the benefits of IG-IMRT in patients treated in daily practice are scarce. We compared dose distributions and acute gastrointestinal (GI) and genitourinary (GU) toxicity levels of prostate cancer patients treated to 78 Gy (39x 2 Gy) with either IG-IMRT or 3D-CRT.

Materials and Methods: A total of 215 patients treated to 78 Gy with 3D-CRT within a dose escalation trial (1997-2003) and 260 patients treated with IG-IMRT to 78 Gy in the standard arm of a hypofractionation trial (2007-2010) are included in this analysis. Applied margins were 10mm (3D-CRT) and 5-8mm (IG-IMRT), and both used 0 mm towards the rectum for the 10 Gy boost. Dose surface histograms of anorectum, anal canal and bladder were compared. Furthermore, in both trials identical toxicity questionnaires were prospectively distributed at baseline, at fraction 20 and 30 and 90 days after treatment. Slightly modified RTOG grade ≥1, grade ≥2 and ≥3 toxicity endpoints were derived directly from the patient-reported questionnaires. Univariate (UV) and multivariate (MV) binary logistic regression was performed.

Results: IG-IMRT resulted in significant lower median volumes receiving 5- 75Gy (all p values <0.001) for anorectum (Figure 1a), anal canal and bladder. The mean dose to the anorectum was 34.4 Gy vs. 47.3 Gy, 23.6 Gy vs. 44.6 Gy for the anal canal and 33.1 Gy vs. 43.2 Gy for the bladder (all p<0.001). Acute toxicity reached a maximum at fraction 30 for most endpoints, as shown for proctitis grade ≥2/ ≥3 in Figure 1b. After adjusting for risk factors at MV analysis, IG-IMRT resulted in significantly lower overall GI grade ≥2 RTOG toxicity (29% vs. 49%, p=0.002, odds ratio (OR) 0.49) and overall GU grade ≥2 toxicity (38% vs. 48%, p=0.009, OR 0.59). Significantly lower incidences were reported for the endpoints abdominal cramps (34% vs. 46%), tenesmus (49% vs. 62%), mucous discharge (47% vs. 62%), grade ≥2 proctitis (27% vs. 44%), stool frequency ≥6/day (8% vs 19%), and urinary frequency ≥12/day (19% vs. 30%) (p values 0.002-0.028). Comparable incidences (p values >0.05) were found for incontinence (both 27%), diarrhea (both 14%), rectal blood loss (12% vs. 20%) and nycturia ≥5/night (23% vs. 27%).